Helping Massachusetts Municipalities Create a Cleaner Energy Future

COMMONWEALTH OF MASSACHUSETTS

Deval L. Patrick, Governor
Richard K. Sullivan, Jr., Secretary
Mark Sylvia, Commissioner

Renewable Heating and Cooling

Webinar

February 13, 2012

1:00 PM

The webinar will start in a few minutes…

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Introduction: Green Communities Division

Lisa Capone

Deputy Director

Green Communities Division

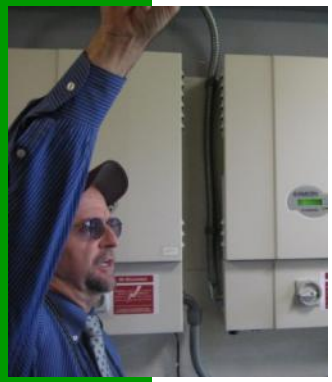
Green Communities Division

Serves as the hub for all Massachusetts cities and towns on energy matters

Helping Massachusetts Municipalities Create A Cleaner Energy Future

Outreach - Regional Coordinators

- Regional Coordinators act as direct liaisons with cities and towns on energy efficiency and renewable energy activities
- Located at each of the DEP Regional Offices:



SERO – LAKEVILLE: Seth Pickering
Seth.Pickering@state.ma.us

NERO – WILMINGTON: Joanne Bissetta
Joanne.Bissetta@state.ma.us

CERO – WORCESTER: Kelly Brown
Kelly.Brown@state.ma.us

WERO – SPRINGFIELD: Jim Barry
Jim.Barry@state.ma.us

Helping Massachusetts Municipalities Create A Cleaner Energy Future

Programs & Resources for Municipalities

- Green Communities Designation and Grant Program
- MassEnergyInsight energy tracking and analysis tool
- Municipal Energy Efficiency Program
- Energy Management Services Technical Assistance
- Partnerships with Mass. CEC – Solarize MA and Community Energy Strategic Planning
- Owner's Agent Technical Assistance
- Massachusetts Municipal Energy Group (MMEG) – operated by MMA and funded by DOER
- Website filled with tools & resources
  www.mass.gov/energy/greencommunities

Email updates – Sign up on the Green Communities web page

Recording & Presentation

- The webinar is being recorded and will be available on our website in approximately 48 hours at: www.mass.gov/energy/greencommunities
- The slide presentation will also be posted at: www.mass.gov/energy/greencommunities
- Websites are also listed at end of presentation

Poll Question 1

We would like to know our audience, are you a:

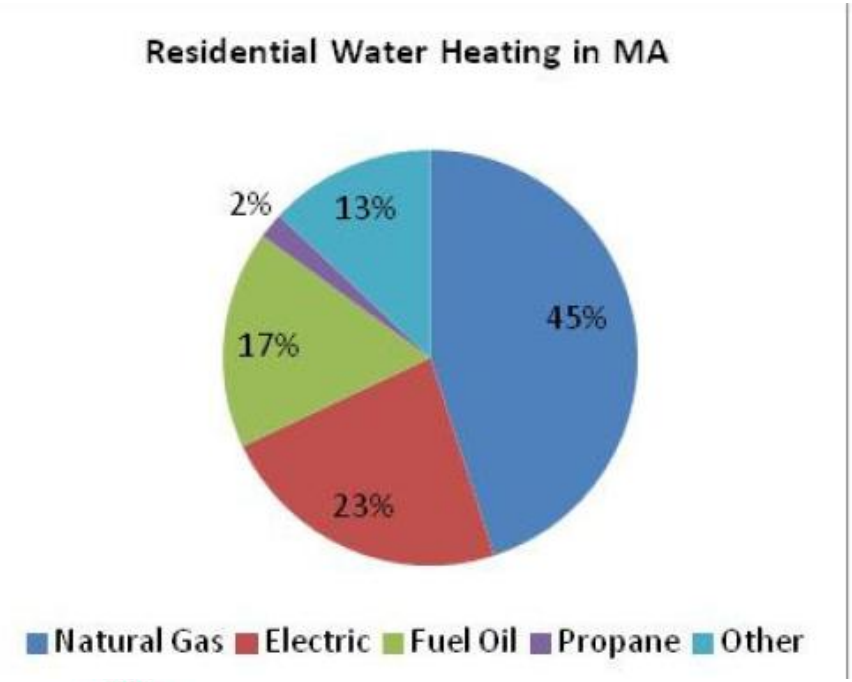
a) Municipal official
b) Energy manager or energy/climate committee member
c) A representative from an energy company
d) Vendor or installer of renewable heating/cooling appliances
e) Other

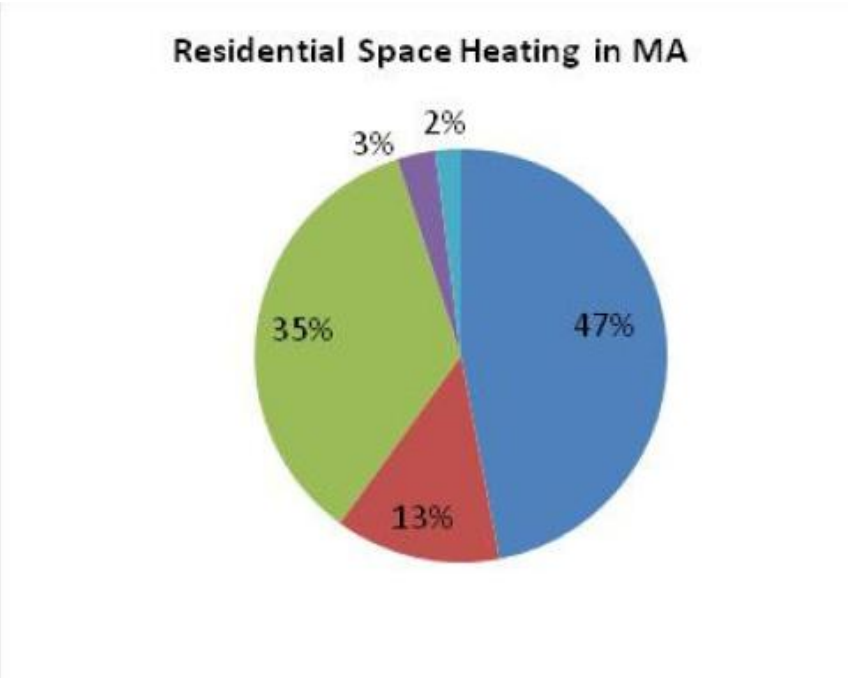
Renewable Heating and Cooling in Massachusetts

Bram Claeys, Renewable Policy Director
Rob Rizzo, Bioenergy Program Manager

Thermal fuel use in Massachusetts

- Space heating and cooling & water heating = 54% total building energy use
- 1/3 of homes heating system > 15 years old





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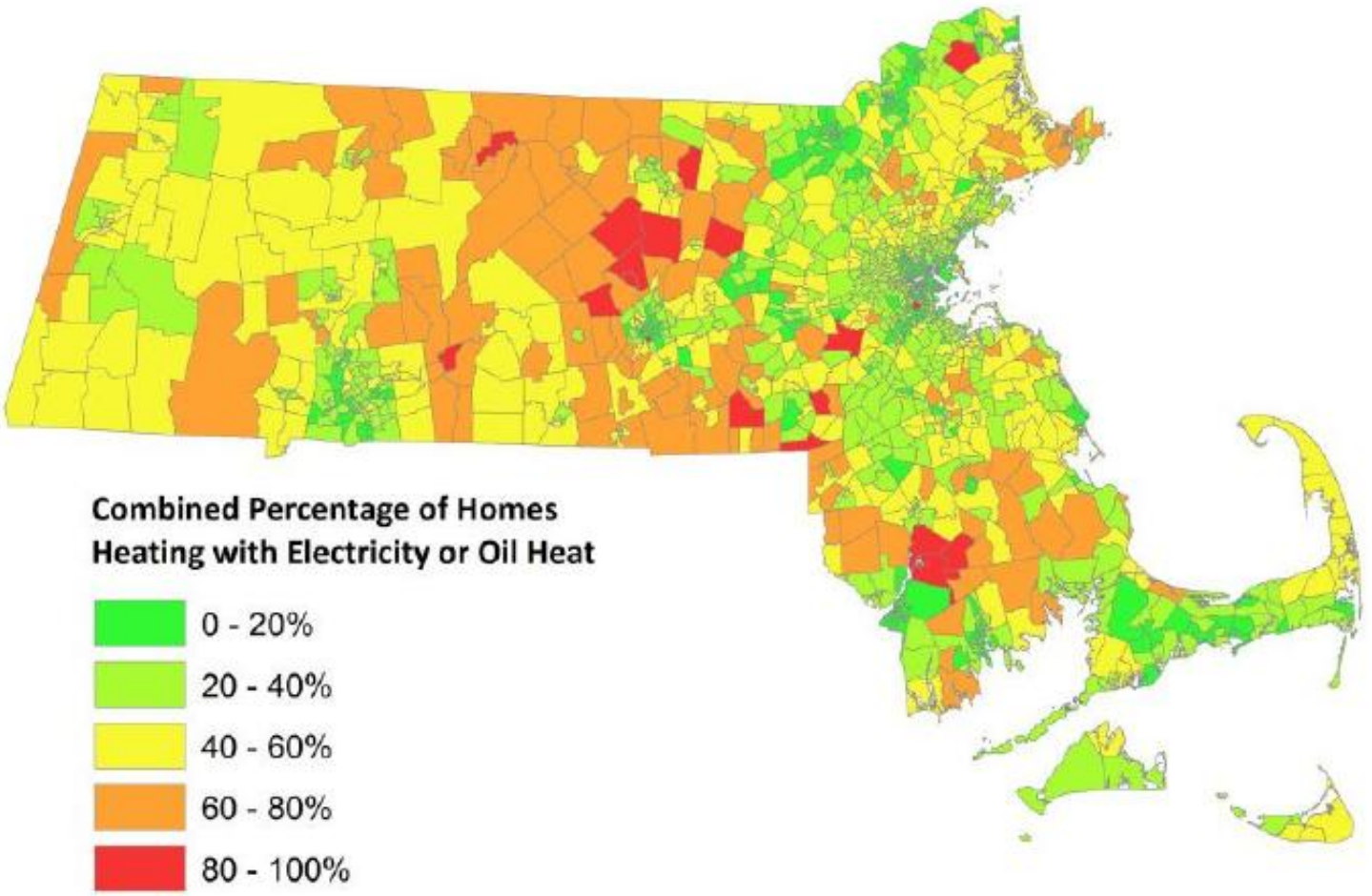
High Cost Fuels in MA

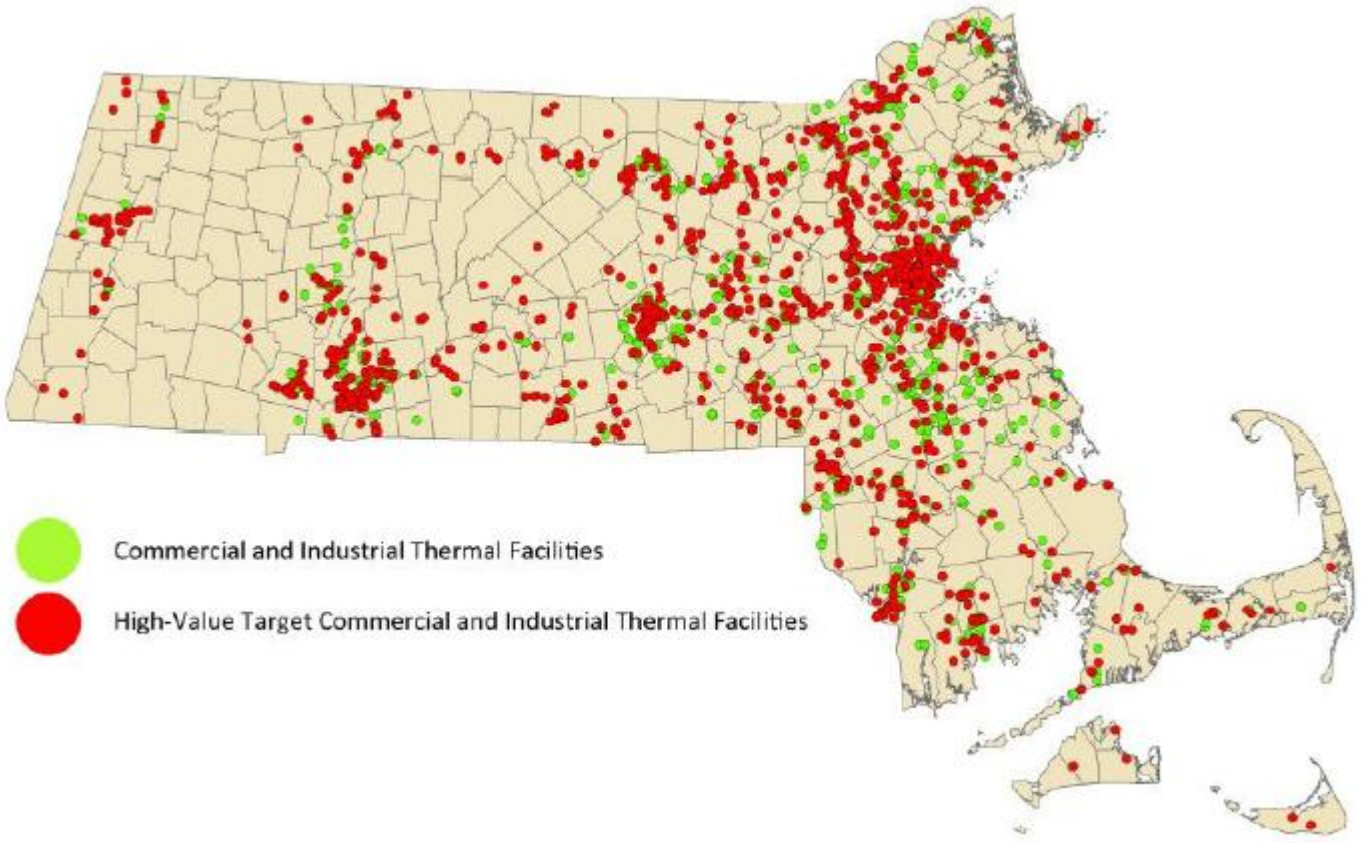


Source: MassCEC

Helping Massachusetts Municipalities Create A Cleaner Energy Future

Industrial thermal energy users in MA

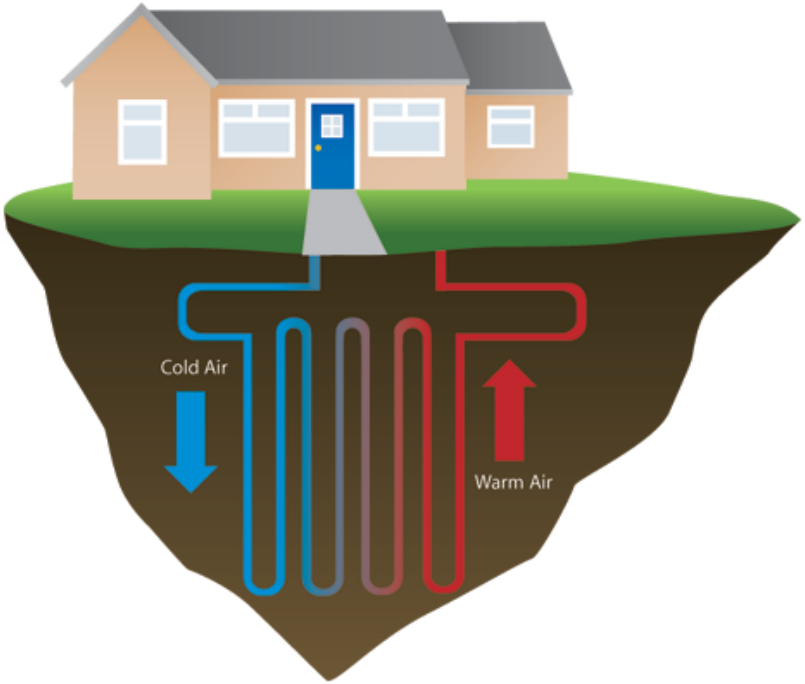
High cost fuels = over 11 trillion BTUs / 3,224 GWh per year

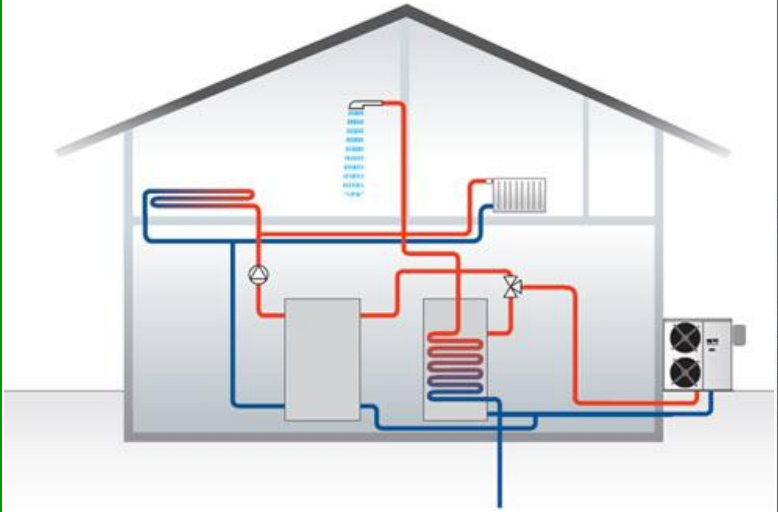


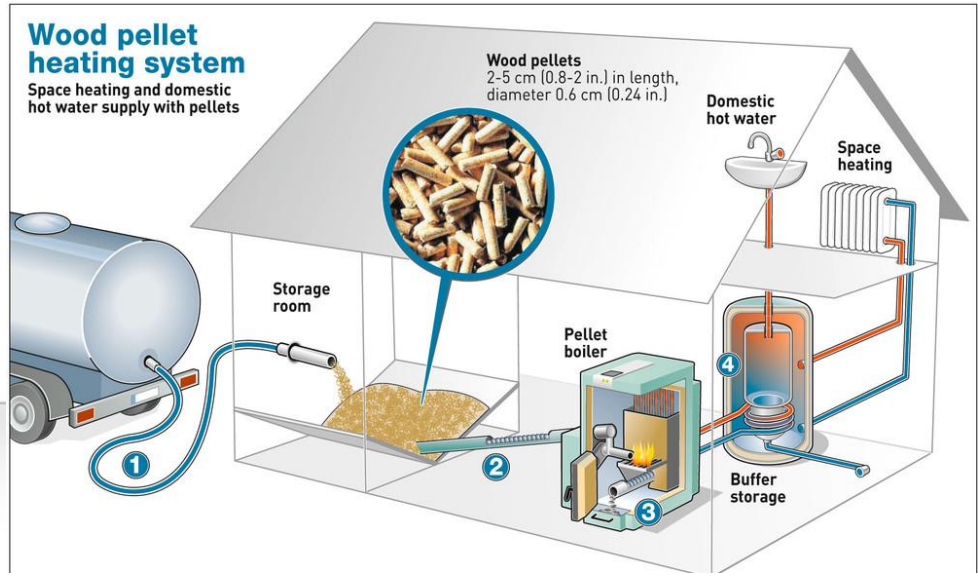
Source: MassDEP

Renewable (RE) thermal technologies

- **Biomass**: highly efficient, variable systems with low air emissions
  - Using wood or other biomass such as grasses, in the form of cordwood, pellets or chips
- **Solar Hot Water**: collectors providing additional heat for space heating, domestic hot water, process heat or other low temperature heating needs
- **Heat pumps**: highly efficient systems of compressors/expanders and heat exchangers using the thermal energy of ambient air, water or underground to heat and cool buildings
  - Attention: account for electricity consumption by pumps and compressors
- **Advanced biofuels**: biomass derived liquid fuels delivering at least a 50% reduction in lifecycle GHG emissions
- **Biogas**: digester gas from Anaerobic Digestion or capped landfills used for heating purposes at the site of capture, or by mixing it in the natural gas pipelines.


Cold Air
Warm Air




Wood pellet heating system
Space heating and domestic hot water supply with pellets
Wood pellets
2-5 cm (0.8-2 in.) in length, diameter 0.6 cm (0.24 in.)
Domestic hot water
Space heating
Storage room
Pellet boiler
Buffer storage
1
2
3
4

Conditions for RE thermal

Conditions & Requirements		Biomass - pellet	Biomass - chip	Solar hot water	Heat pump - GSHP	Heat pump - ASHP	Biofuel	Biogas (pipeline)	Thermal recovery
Heating Load	**Temperature?** High (H) or Low (L)	H + L	H + L	L	L	L	H + L	H + L	L
	Load Variability? Steady (S) or Variable (V)	V	S	V	S	S	V	V	V
Cooling load	**Typically provides cooling?** Yes (Y) or No (N)	N	N	N	Y	Y	N	N	N
Roof space	**Roof requirements?** Yes (Y) or No (N)	N	N	Y	N	N	N	N	N
Sectors typically served	Residential (Res) Commercial (Com) Industrial (Ind)	Res Com --	-- Com Ind	Res Com Ind	Res Com --	Res Com --	Res Com Ind	Res Com Ind	Res Com Ind
Ground conditions	**Geology requirements?** Yes (Y) or No (N)	N	N	N	Y	N	N	N	N
Building site and space	**Equipment space requirements?** Small (S) or Large (L)	S	L	S	L	S	S	S	S/L

Benefits of RE heating and cooling

- Reduced use of imported high cost fuels
  - Lifecycle savings
- Alleviate need to expand natural gas access
- Environmental benefits
  - Cleaner air
  - Reduced greenhouse gas emissions
- Job creation
- Technological innovation
- Helps achieve zero net energy buildings

Barriers to RE heating and cooling

- High upfront costs
- Conventional HVAC sector not familiar with renewable technologies
- Poor public awareness of economic, environmental, and societal benefits
- Opaque regulatory standards
- Lack of adequately trained personnel

Poll Question # 2

What is your interest in this webinar? Are you:

a) Gathering information on the topic?
b) Preparing for a new or retrofit of a heating and/or cooling system?
c) In the process of installing a renewable heating and/or cooling system?
d) Looking to enter the market of renewable heating/cooling?
e) Other?

Renewable Energy Thermal Technologies

Residential, Commercial/Industrial, Municipal, and Institutional Opportunities

- Air Source Heat Pumps
- Ground Source Heat Pumps
- Solar Thermal
- Advanced Biofuels
- Combined Heat and Power (CHP)
- Biomass

Renewable Portfolio Standard - Biomass Policy Regulatory Process

Patrick-Murray Administration Announces Enactment of Biomass Regulations

August 17, 2012

225 CMR 14.00

RENEWABLE ENERGY PORTFOLIO STANDARD – CLASS I

Mass MoCA
$800,000

Transformative Space Conditioning

A.R. SANDRI, INC

$3,200,000

Biomass Fuel Program

Sandri Project

- $3.2 million requested
- $4.8 million – project Total
- Sandri Companies completed a high-impact oil heat program in Franklin and Hampshire Counties, to shift oil heat users to wood pellet boilers.
- Three sub-projects:
  - discounted energy audits for a segment of its residential customers.
  - provided incentives to act on audit recommendations,
  - offered rebates for ultra-low-emission wood pellet boilers.

Sandri Project

- 110,000 gallons of fossil fuel displacement/yr
  - Stoneleigh-Burnham School: Greenfield, MA
  - Linden Hill School: Northfield, MA
  - Greenfield Community College
  - Full Bloom Organic Farm: Whately, MA
  - Sandri Headquarters: Greenfield, MA
  - Fox Inn motel: Bernardston, MA
  - Greenfield Fire Station
  - Centennial House B&B: Northfield, MA

Renewable Thermal Programs

Pilot Programs

DOER / MassCEC / MassDEP partnership

- Woodstove change out - $1.2 million
  - $2000 rebate for low income households
  - $1000 rebate for all others
- Outdoor Hydronic Heater change out- $150,000
  - $15,000 per household
- Residential wood pellet boiler - $500,000
  - $7000 - $13,000 per household
- Industrial/commercial wood boiler - $1.2 million
- Community District Heating - $2 million

Renewable Thermal Programs

- Residential and commercial air source and ground source heat pump programs - $2 million
- Renewable heating – DHCD - $2 million
- Renewable thermal business investment financing program - $3 million
- DOE project SAPHIRE - $715,000

Schools and Public Housing Integrating Renewables and Efficiency

- Ongoing: MassCEC Commonwealth Solar Hot Water program - $10 million (until 2016)

Additional Programs on the Horizon

- State Pilot Projects - $2 million

  demonstrate new, innovative clean technologies at state facilities under DOER's Leading By Example
- Combined Heat and Power - $5 million

  establish a subsidized loan program to support the financing of CHP units in MA
- Reduce Fuel Oil and Electric Heating in State and Municipal Buildings - $2.5 million
- Solar Water Heating and Wood Pellet Stoves for LIHEAP Households - $1 million
- RE Thermal Market Investment Support - $3 million

Thermal in the APS

- EEA/DOER study for the legislature
  - Submitted Dec. 31, 2012
- Inclusion in MA Alternative Portfolio Standard presents opportunity to structurally overcome cost hurdle of renewable thermal
  - Pilot programs inform program design
  - Statutory change necessary
  - Attention to minimum standard

References

- Reports
  - Market analysis - http://www.mass.gov/eea/docs/doer/renewables/renewable-thermal-study.pdf
  - Thermal in the APS - http://www.mass.gov/eea/docs/doer/pub-info/heating-and-cooling-in-aps.pdf
- Pilot programs
  - http://masscec.com/
  - www.mass.gov/doer/

Q&A

THANK YOU!

- The webinar was recorded and will be available for viewing at your convenience on our website at:

  www.mass.gov/energy/greencommunities

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